

# EPA Method 8081A Chlorinated Pesticide Analysis Using Two New GC Columns

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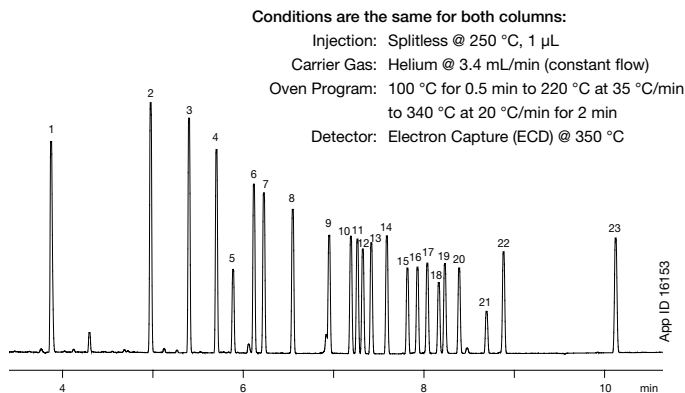
## Introduction

The use of many pesticides has been limited or discontinued due to the health and environmental risks they pose. However, the persistence of these compounds in the environment has left many sites heavily contaminated and in need of remediation.

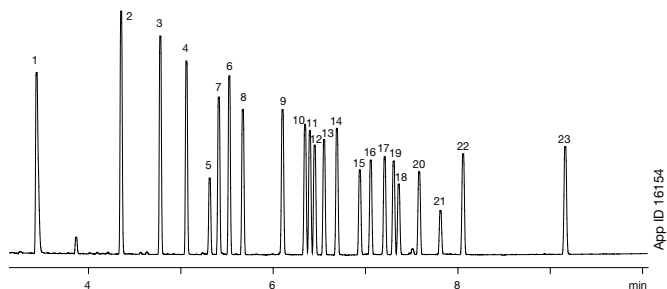
The US EPA regulates the testing of 20 specific chlorinated pesticides under the official Method 8081A. The method specifies an Electron Capture Detector (ECD), which is extremely sensitive for chlorinated compounds. However it does not provide any confirmatory information about the peak.

To reduce the occurrence of misidentifications, the method requires the use of two GC columns of dissimilar selectivity in a parallel configuration. The EPA considers an analyte's presence confirmed if it has a peak at the pre-determined retention time on both columns.

**Zebtron MultiResidue-1** 30 meters x 0.32 mm x 0.50  $\mu$ m



**Zebtron MultiResidue-2** 30 meters x 0.32 mm x 0.25  $\mu$ m



**Figure 1:** Baseline resolution of 20 chlorinated pesticides in 10 minutes. 1 = 2,4,5,6-Tetrachloro-m-xylene (TCMX), 2 = 1-Bromo-2-nitrobenzene, 3 =  $\alpha$ -BHC, 4 =  $\gamma$ -BHC (Lindane), 5 =  $\beta$ -BHC, 6 =  $\delta$ -BHC, 7 = Heptachlor, 8 = Aldrin, 9 = Heptachlor epoxide, 10 =  $\gamma$ -Chlordane, 11 =  $\alpha$ -Chlordane, 12 = Endosulfan I, 13 = 4,4'-DDE, 14 = Dieldrin, 15 = Endrin, 16 = 4,4'-DDD, 17 = Endosulfan II, 18 = Endrin aldehydes, 19 = 4,4'-DDT, 20 = Endosulfan sulfate, 21 = Methoxychlor, 22 = Endrin ketone, 23 = Decachlorobiphenyl (DCB, surr)

The EPA outlines strict performance guidelines that must be met for compound linearity, percent relative standard deviation (% RSD), and breakdown of DDT and endrin. Column resolution and performance are critical in meeting these requirements. Zebtron MultiResidue™ (MR) columns provide baseline resolution of all EPA Method 8081A chlorinated pesticides in less than 10 minutes (Figure 1). In calibration curves ranging from 5-250 ppb, the columns provided results that far exceeded the EPA requirements for % breakdown of DDT and endrin, linearity (% RSD), and resolution of critical isomers (Tables 1 & 2).

Both columns are MS certified, so they can also be used with GC/MS for multi-residue pesticide methods. The unique selectivity offered by each phase allows for increased resolution of critical compounds vs. standard 5ms type phases. Retention time data is available for over 300 different pesticides on GC/MS, further simplifying new method development.

**Table 1.** Five-point calibration curve at 5, 10, 25, 100, and 250 ppb

Analyte	Zebtron MR-1 % RSD*	Zebtron MR-2 % RSD*	US EPA Specifications
$\alpha$ -BHC	6.75	7.91	< 20
$\gamma$ -BHC (Lindane)	5.52	5.70	< 20
$\beta$ -BHC	3.57	9.21	< 20
$\delta$ -BHC	5.90	7.58	< 20
Heptachlor	4.21	5.37	< 20
Aldrin	4.34	5.25	< 20
Heptachlor epoxide	3.70	4.48	< 20
$\gamma$ -Chlordane	3.68	3.61	< 20
$\alpha$ -Chlordane	2.91	3.39	< 20
Endosulfan I	2.93	3.91	< 20
DDE	4.56	6.77	< 20
Dieldrin	3.85	4.75	< 20
Endrin	4.17	3.84	< 20
DDD	4.79	7.36	< 20
Endosulfan II	2.63	3.53	< 20
Endrin aldehyde	4.11	4.72	< 20
DDT	3.70	5.42	< 20
Endosulfan sulfate	3.31	3.20	< 20
Methoxychlor	7.39	4.21	< 20
Endrin ketone	3.48	3.95	< 20
Average	4.28	5.21	< 20

\*Calculated using response factors as per EPA guidelines

**Table 2.** Percent breakdown of endrin & DDT as per EPA guidelines

Analyte	Zebtron MR-1 % Breakdown	Zebtron MR-2 % Breakdown	US EPA Requirements
Endrin	5.3	7.0	< 15
DDT	2.3	2.9	< 15

Zebtron MultiResidue columns represent a solution for all classes of pesticides analysis. Each phase was optimized to resolve a specific set of analytes, however both are good for a wide variety of pesticides. To learn more about these new columns, please contact Phenomenex or visit <http://www.phenomenex.com/MultiResidue>

## ORDERING INFORMATION

Part No.	Description
7HM-G016-17-TN	MultiResidue-1, 30 m x 0.32 mm x 0.50 $\mu$ m
7HM-G017-11-TN	MultiResidue-1, 30 m x 0.32 mm x 0.25 $\mu$ m



[www.phenomenex.com](http://www.phenomenex.com)

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